

Precision Measurement Series: Level I

- **Introduction to Measurement and Calibration**
 - Introduction
 - Development and Concerns of Metrology
 - Standards and Standardization
 - Managing the Metrology System
 - Making Good Measurements: Elements of a Measurement System
 - Units and Measurement Instruments
- **Safety in the Calibration Lab**
 - Introduction
 - General Roles & Responsibilities for Supervisors and Technicians
 - Electrical Safety for Cal Lab Operations
 - Fires
 - Chemical
 - Pressure
 - Lasers
 - Temperature
 - Radiation
- **Precision Electrical Test Measurement and Calibration**
 - Basic DC & Low Frequency Measurement
 - Standards and Traceability
 - Practical Considerations for Precision Electrical Measurement
 - Sources of Measurement Error
 - Additional Topics
- **Precision Dimensional Measurement**
 - Linear Measurement Standards
 - Measuring Instruments
 - Gage Blocks
 - Angular Measurements
 - Optical Instruments
- **Precision Temperature Measurement**
 - Introduction
 - Heat and Temperature
 - Temperature Scales
 - Thermometers
 - Related Heat Sensing and Measuring Instruments
- **Precision Pressure & Vacuum Measurement**
 - Pressure Types
 - Pressure Measurement Devices
 - Transducers
 - Principles of Vacuum
- **Precision Flow Measurement**
 - Density Principles and Measurement Corrections
 - Specific Gravity
 - Fluid Flow Measurements
 - Flow Measurement Devices
- **Precision Mass Measurement**
 - Mass & Weight Principles
 - Weighing Instruments
 - Location
 - Operation
 - Weights
- **Physical Influences**
 - Data Acquisition
- **Precision Force & Torque Measurement**
 - Stress and Strain
 - Characteristics and Operation of a Load Cell
 - Torque Concepts and Applications
 - Torque Tester Calibration
 - Torque Auditing
- **Precision Humidity Measurement**
 - Traceability
 - Key Terminology
 - Specification
 - Humidity Measuring Instruments
 - Chilled Mirror (CM) Hygrometer Theory
 - CM Operation and Maintenance
 - Sensors
 - Accuracy of Measurement
 - Calibration
- **Measurement Uncertainty**
 - Components
 - Essentials of Expressing Measurement Uncertainty
 - Specification
 - Risk Analysis Introduction
 - Related Statistical Tools
 - Standards
 - Software
 - Features and Benefits
 - Summary

Precision Measurement Series: Level II

- **Acoustics and Vibration**
 - Measurement Methods
 - Measuring Instruments
 - Quantifying Sound and Vibration
 - Accelerometer Design and Calibration
- **Dimensional: Roundness, Hardness, Surface Texture**
 - Measurement Methods
 - Measuring Instruments
 - Causes
 - Quantifying and Expressing
- **AC/DC Calibration and Metrology**
 - Basic concepts, including power produced by voltage
 - Using AC-DC transfer standards
 - Inductance and Capacitance
- **Immittance and AC Ratio**
- **Time and Frequency**
 - Time
 - Digital Clock Accuracy and Synchronization
 - Time Base Standards in Clocks
 - Sources of Error
 - Time Code Formats
 - Offset
 - Stability
 - Frequency Standards
 - Transfer Standards
 - Performance
- **Test Instruments Operation and Calibration**
 - Test Equipment Administration
 - Test Equipment Safety Precautions
- **Basic Measurements**
- **Advanced Measurements**
- **Measurement Methods**
- **Meters**
- **Common Test Equipment**
- **Operation of Common Electronic Instruments**
- **The Oscilloscope and Spectrum Analyzer**
- **Water Quality, Measurement, pH, Conductivity**
 - pH Measurement Intro
 - pH Calibration Measuring Instruments
 - Uncertainty of pH Measurement
 - Power Measurements
 - Conductivity Intro
 - Conductivity Measurements

- Influences on Conductivity Measurements Applications
- **Uncertainty Management**
 - Introduction
 - What is a Specification?
 - What is a Tolerance?
 - Measurement Uncertainty
 - Accreditation
 - Ratios
 - Specifications
 - Tolerances, and Uncertainty
 - Changes to and Adjustment of Decision Rules
- **Metrology Applications for Engineers and Scientists**
 - Measurement Parameters
 - Statistics
- Measurement Uncertainty
- Applications
- **Fiber Optics**
 - Fiber Optics Background
 - Fiber Optics Concepts
 - Optical Fibers and Cables
 - Optical Splices
 - Connecters and Couplers
 - Fiber Optic Measurement Techniques
 - Optical Sources and Fiber Optic Transmitters
 - Optical Detectors and Fiber Optic Receivers
 - Fiber Optic Links
- **CMMs**
 - Review of Basic Concepts and Vocabulary
- Basic CMM Measurements
- Sampling Issues
- Probing Systems
- Basic CMM Accuracy and Specifications
- Thermal Effects
- CMM Calibration
- Measurement Uncertainty
- **Certified Calibration Technician (CCT) Test Prep**
 - General Methodology
 - Measurement Systems
 - Calibration Systems
 - Applies Mathematics and Statistics and Measurement Uncertainty
 - Quality Systems and Standards
 - Uncertainty in the Workplace

WorkPlace Training/Keysight Technologies, RF Fundamentals

- **Cable and Connector Care**
 - How to use different types of connectors most effectively
 - How to inspect and maintain connectors to ensure accuracy and prevent damage
 - Apply the industry standard specifications for connectors
- **Transmission Line Fundamentals**
 - Concept of a transmission line versus a simple "hookup"
 - Relationship between reflections and impedance
 - Meaning of characteristic impedance
 - Calculations to move between VSWR, return loss and reflection coefficient
- **Power Measurement Basics**
 - Definition of the three basic types of power measurements and their importance
 - Power meter/sensor measurement methods
 - Two most prevalent sensor technologies
 - Advanced measurements techniques
 - Formulas to calculate power measurement uncertainty
- **Signal Generator Sources**
 - Basics of amplitude modulation
 - Basics of frequency modulation
 - Basics of digital modulation
- **General Spectrum Analysis**
 - Understand the basic functionality of Spectrum Analyzers
 - Know how to use Spectrum Analyzers to their fullest potential
 - Know how to make more effective measurements for particular applications
- **Network Analysis**
 - Basics of network analysis
 - How to use Network Analyzers to their fullest potential
 - How to make more effective measurements for particular applications

ISO/IEC 17025:2017 Conformance

- **Introduction to ISO/IEC 17025 for Technicians**
 - Introduction
 - Audits and Auditors
 - The Assessment Process
 - After the Assessment
 - Internal Assessments
- **Assessment to the Requirements of ISO/IEC 17025**
 - Introduction
 - Audits and Auditors
 - The Assessment Process
 - After the Assessment
 - Internal Assessments
- **Interval Analysis**
 - Introduction to Interval Analysis
 - Basic Statistics
 - Statistical Techniques
 - Reliability Models
 - Calibration Interval Analysis
 - **Bonus:** Interval Analysis Calculator Tool Included!
- **Proficiency Testing**
 - Introduction to Proficiency Testing
 - Justification for Proficiency Testing Participation
 - Standards and Other Documents Associated with Proficiency Testing
- A Simple Organization of a Proficiency Test Program
- Basic Statistics in Proficiency Testing
- Measurement Uncertainty in Proficiency Testing
- Proficiency Testing Schemes (with examples for testing/calibration labs)
- Proficiency Testing Data Interpretation and Analysis (with examples)
- Post-Proficiency Testing Actions
- Summary of Proficiency Testing
- **Bonus:** Interval Analysis Calculator Tool Included!

